Land Capability Classification for Agriculture in British Columbia

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LAND CAPABILITY CLASSIFICATION FOR AGRICULTURE IN BRITISH COLUMBIA

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PREFACE

"Land Capability Classification for Agriculture in British Columbia" is a revision and update of previous manuals dealing with agricultural land capability classification. Its intent is to provide pedologists in British Columbia with consistent guidelines for assessing agricultural capability of land at a detailed or on-site level of investigation. The system can also be applied at smaller map scales.

The interpretive classification system groups mineral and organic soils into seven classes according to potentials and limitations for agriculture. Land capability classification indicates the type and extent of any soil and climate parameters which affect the range of crops that can be grown and/or the management inputs required.

This document is not intended to preclude other interpretations of soil and climate inventory information or further refinements of agricultural land capability classification. Examples of other interpretations or refinements include assessments of the:

a) suitability of land for production of specific crops;
b) productivity (yield per hectare) of crops on various land areas;
c) specific management inputs required to reach an acceptable level of production of a particular crop or range of crops;
and
d) feasibility of implementing various land developments and improvements to achieve acceptable levels of production.

In general, under the Agricultural Land Capability Classification system, the range of suited crops decreases from class 1 to class 7 and/or the management inputs required to produce suited crops increases from class 1 to class 7. However, the combination of soils, climate, and types of agriculture in a particular area or region may make certain lower capability lands valuable for agriculture. Some examples of this situation include:

a) acid peat soils in the Lower Fraser Valley used for cranberry and blueberry production.
b) rapidly drained, coarse textured, stony soils of the Okanagan Valley which are highly suited to tree fruit and grape production (see Chapter 10).
c) some class 5 lands in the Bulkley Nechako Regional District which are equivalent to class 3 and 4 lands as to capacity for production of cultivated forages for the beef industry in the region.
d) some lower elevation rangelands in the Central and Southern Interior which provide critical early spring and late fall grazing for the ranching industry.
e) locations for non-soil bound agriculture, such as greenhouses; poultry, swine, and beef feeding operations; and mushrooms which are in conjunction to, and compatable with, rural areas suited to crop production.

This document replaces all previous agricultural land capability classifications and describes the criteria to be used for assessing the agricultural capability of lands in British Columbia.

S. Fellerson

British Columbia Ministry of
Agriculture and Food

British Columbia Ministry of
Environment

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This publication was prepared by E. Kenk, Senior Pedologist with Ministry of Environment, Planning and Resource Management Division and I. Cotic, Soil Specialist with Ministry of Agriculture and Food, Soils Branch.

The classification system presented here draws heavily on the following three publications:

1. The Canada Land Inventory. 1965. Soil Capability Classification for Agriculture. Department of Forestry, CLI Report No. 2, Ottawa, 16 pp.

2. Runka, G. G. 1973. Methodology - Land Capability for Agriculture - British Columbia Land Inventory. Soil Survey Division, BCDA, Kelowna, 25 pp.

3. Leeson, B. 1969. An Organic Soil Capability Classification for Agriculture and A Study of the Organic Soils of Simcoe County. ARDA, Guelph, 82 pp.

The majority of changes incorporated in this report deal with more specific guidelines for classifying lands for agricultural capability. These changes are assembled from the experiences of staff of the Surveys and Resource Mapping Branch*, Ministry of Environment; Soils Branch, Ministry of Agriculture and Food; British Columbia Pedology Unit, Agriculture Canada and representatives of the Provincial Agricultural Land Commission.

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*Formerly the Terrestrial Studies Branch

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1. INTRODUCTION

This report, describing a classification system of land capability for agricultural use is a modification and refinement of existing small scale methodology in British Columbia. Its purpose is to provide guidelines for consistent assessment of agricultural land capability at on-site and large map scale levels of determination. The classification also can be applied at smaller map scales. An example legend recommended for use on large scale maps is given in Appendix 2.

The system is to be applied consistently across the Province, except in designated areas in the Okanagan Valley and around Creston, where the Convention for Tree Fruit and Grape Production is to be applied (see Chapter 10).

2. REVISIONS INTRODUCED IN THE CLASSIFICATION

The "Soil Capability Classification for Agriculture" (Canada Land Inventory, 1965) was designed for national use and the guidelines given for placing soils in capability classes were necessarily broad. This classification system was later modified to meet British Columbia requirements in "Methodology - Land Capability for Agriculture - British Columbia Land Inventory (CLI)" by Runka (1973). The modifications included:

i) both irrigated and dry farm ratings
ii) capability of organic soils for agriculture
iii) land capability for tree fruit and grape production, and
iv) a tentative land capability for grazing.

Both reports provided adequate guidelines for assessment of agricultural land capability at reconnaissance map scales. However, as more detailed assessments of land for agricultural capability were carried out, some inherent weaknesses were realized, and new ideas, worthy of inclusion into the classification, became evident. The additions and changes contained in this publication are made with the intention of promoting consistency among pedologists in assessment of lands for agricultural capability at detailed and on-site levels of investigation. The revisions encompass a number of aspects, but the basic concept of the original classification schemes (Canada Land Inventory, 1965; Leeson, 1969; Runka, 1973) remains unaltered. The major revisions are as follows:

1) A shift in emphasis in the capability class definitions from the range of crops concept, which is largely influenced by climate, to relative intensity of conservation and management practices required, which is dominantly influenced by the land. Note that climate is still the initial consideration in establishing the capability class level.
2) Minor revision of capability subclass definitions, the deletion of subclasses S (cumulative minor adverse characteristics) and X (adverse soil characteristics), and replacement of subclass M (moisture limitation) with a more comprehensive assessment of moisture deficit, represented by subclass A (soil moisture deficiency).

3) More definitive guidelines for assessing subclasses and for placing lands in capability classes.
4) Adoption, with modification, of the organic soil capability classification for agriculture proposed by Leeson (1969), in "An Organic Soil Capability Classification for Agriculture and A Study of the Organic Soils of Simcoe County" to replace existing British Columbia classification contained in Runka, 1973.
5) Replacement of the irrigated and dry farm ratings with a modified "improved" and "unimproved" rating concept.
6) Modification of map use and cartographic conventions.
7) Deletion of the "(Tentative) Land Capability for Grazing" classification suggested for use in British Columbia (Runka, 1973). This tentative classification has been replaced by "Forage Capability Classification for British Columbia" by Demarchi and Harcombe (1982).
8) Modification of the "Land Capability for Tree Fruit and Grape Production" proposal used in British Columbia (Runka, 1973).

3. GENERAL CONSIDERATIONS, ASSUMPTIONS AND DEFINITIONS

The land's capability for agricultural uses is determined by assessing both climate and soils. In general, the climate determines the range of crops possible in an area and the soils govern the type and relative level of management practices required. The land capability for agriculture classification is applied at a number of survey intensity levels and is developed from reconnaissance, detail or on-site soils information, and 1:100 000 "Climate Capability Classification for Agriculture" maps or other more specific climatological information.

In this classification, mineral and organic soils are each grouped into seven classes according to their potentials and limitations for agricultural use. Lands in Classes 1 to 4 inclusive are considered capable of sustained production of common cultivated field crops. The need for management practices to overcome limitations increases and/or the possible range of crops decreases from Class 1 to Class 4. Class 5 lands are capable of use only for producing perennial forage crops or specially adapted crops. Class 6 lands are capable of only providing sustained natural grazing for domestic livestock. Class 7 lands are incapable of use for either arable culture or grazing.

Note that the capability classification takes into account the relative degree and type of limitation or hazard to agricultural use and/or the range of possible crops. It also indicates the type and intensity of management practices required to maintain sustained production. Actual productivity (i.e. yield per hectare) of any specific crop is not considered.

The capability classification is applied to both undeveloped and presently cultivated lands. In general, the level of survey intensity at which the land capability classification has been applied is indicated by the map scale at which the information is published.

The classification is based on the following assumptions:

1) Adherence to sound soil management practices that are common under a largely mechanized system of agriculture.

2) Most lands are rated for both "unimproved" and "improved" conditions. Class 6 and 7 lands are not generally considered to be improvable. They are given only unimproved ratings, except in the cases of excess water (W), soil moisture deficiency (A), or inundation (I) limitations where drainage, irrigation and/or diking may be able to improve Class 6 and 7 lands. Unimproved ratings are based on the conditions that exist at the time of the survey or on-site inspection, without irrigation. Past improvements are assessed as part of the unimproved rating. Forested lands are assessed as if cleared. The following agricultural practices are assumed: tillage, routine fertilizing and liming, planting or seeding, and harvesting the crop.

   Improved ratings indicate the capability after existing limitations and/or hazards have been adequately alleviated . Improvements which are to be considered include drainage, irrigation, diking, stone removal, salinity alleviation, subsoiling, and/or the intensive addition of fertilizers or other soil amendments.

   When assessing improved ratings irrigation water is assumed to be available and inundation is assumed to be controlled by diking. Guidelines for determining adequate levels of improvement for existing limitations and/or hazards are provided under subclass headings.

3) The capability classification of lands in an area may be changed when major reclamation works are installed that permanently change the limitations to agricultural use.

4) The following are not considered in the classification system: distance to market, available transportation facilities, location, farm size, type of ownership, cultural patterns, skill or resources of

individual operators, and hazard of crop damage by storms (e.g. wind, hail).

5) The classification does not include capability of lands for trees, ornamental plants, recreation, or wildlife. A modified classification is provided for tree fruits and grapes. (Refer to Chapter 10 - Modified Land Capability Classification for Tree Fruits and Grapes).

6) Capability ratings are subject to change as new information about the behaviour and responses of the soils becomes available and with advances in agricultural technology.

The land capability classification for agriculture consists of two main components: the capability class, and the capability subclass. The class indicates the relative capability of the land for agricultural use. The subclass indicates the kinds of limitations and/or hazards. The capability class and subclass together provide information about the degree and kind of limitation for agricultural use. In addition to land capability designation, they are also useful for land use planning and assessing management needs.

4. LAND CAPABILITY CLASSES FOR MINERAL SOILS

The capability class, the broadest category in the classification, is a grouping of lands that have the same relative degree of limitation or hazard for agricultural use. The intensity of the limitation or hazard becomes progressively greater from Class 1 to Class 7. The seven land capability classes for mineral soils are defined and described as follows.

CLASS 1 LAND IN THIS CLASS EITHER HAS NO OR ONLY VERY SLIGHT LIMITATIONS THAT RESTRICT ITS USE FOR THE PRODUCTION OF COMMON AGRICULTURAL CROPS.

Land in Class 1 is level or nearly level. The soils are deep, well to imperfectly drained under natural conditions, or have good artificial water table control, and hold moisture well. They can be managed and cropped without difficulty. Productivity is easily maintained for a wide range of field crops.

CLASS 2 LAND IN THIS CLASS HAS MINOR LIMITATIONS THAT REQUIRE GOOD ONGOING MANAGEMENT PRACTICES OR SLIGHTLY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 2 has limitations which constitute a continuous minor management problem or may cause lower crop yields or slightly smaller range of crops compared to Class 1 land but which do not pose a threat of crop loss under good management. The soils are deep, hold moisture well and can be managed and cropped with little difficulty.

CLASS 3 LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE MODERATELY INTENSIVE MANAGEMENT PRACTICES OR MODERATELY RESTRICT THE RANGE OF CROPS, OR BOTH.

The limitations are more severe than for Class 2 land and management practices are more difficult to apply and maintain. The limitations may restrict the choice of suitable crops or affect one or more of the following practices: timing and ease of tillage, planting and harvesting; and methods of soil conservation.

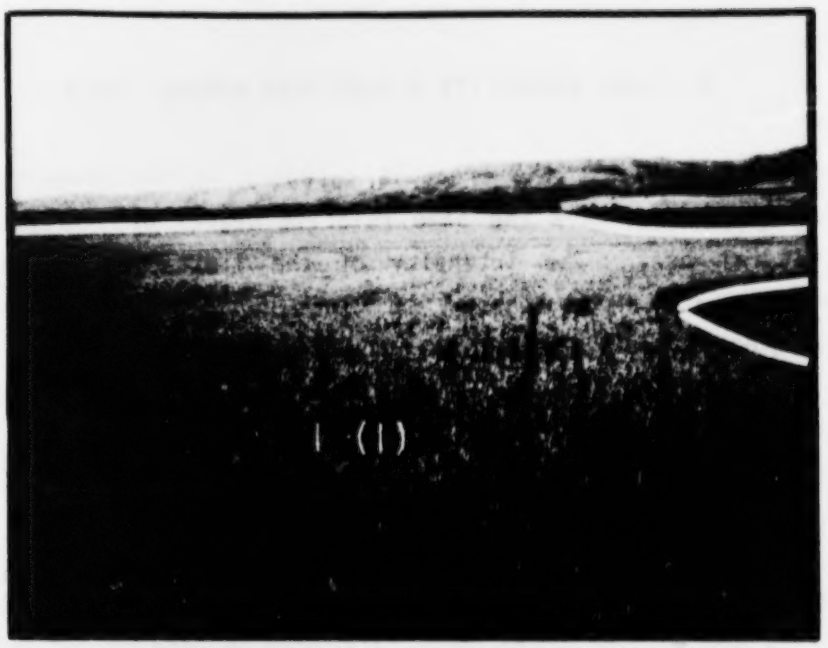

Plate 1. Highly productive wheat field on Class 1 land in Peace River area.

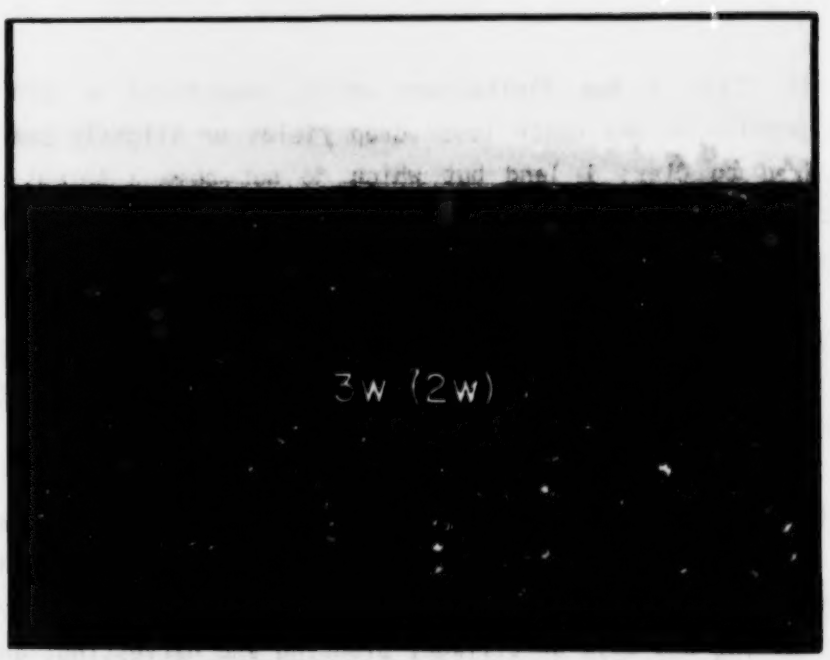

Plate 2. Intensive utilization of Class 3W for the production of row crops in the Fraser Valley. With further improvement this land would be Class 2W.

CLASS 4 LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE SPECIAL MANAGEMENT PRACTICES OR SEVERELY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 4 has limitations which make it suitable for only a few crops, or the yield for a wide range of crops is low, or the risk of crop failure is high, or soil conditions are such that special development and management practices are required. The limitations may seriously affect one or more of the following practices: timing and ease of tillage, planting and harvesting; and methods of soil conservation. Note that in areas which are climatically suitable for growing tree fruits and grapes the limitations of stoniness and/or topography on some Class 4 lands are not significant limitations to these crops. (Refer to Chapter 10).

CLASS 5 LAND IN THIS CLASS HAS LIMITATIONS THAT RESTRICT ITS CAPABILITY TO PRODUCING PERENNIAL FORAGE CROPS OR OTHER SPECIALLY ADAPTED CROPS.

Land in Class 5 is generally limited to the production of perennial forage crops and specially adapted crops (crops such as cranberries suited to unique soil conditions not amenable to a wide range of common crops). Productivity of these suited crops may be high. Class 5 lands can be cultivated and some can be used for cultivated field crops provided unusually intensive management is employed and/or the crop is particularly adapted to the conditions peculiar to these lands. Cultivated field crops may be grown on some Class 5 land where adverse climate is the main limitation, but crop failure can be expected under average conditions. Note that in areas which are climatically suitable for growing tree fruits and grapes the limitations of stoniness and/or topography on some Class 5 lands are not significant limitations to these crops. (Refer to Chapter 10).

CLASS 6 LAND IN THIS CLASS IS NONARABLE BUT IS CAPABLE OF PRODUCING NATIVE AND/OR UNCULTIVATED PERENNIAL FORAGE CROPS.

Land in Class 6 provides sustained natural grazing for domestic livestock (i.e. cattle and sheep) and is not arable in its present condition. Land is

placed in this class because of severe climate, or the terrain is unsuitable for cultivation or use of farm machinery, or the soils do not respond to intensive improvement practices. Some unimproved Class 6 lands can be improved by draining, diking and/or irrigation.

CLASS 7 LAND IN THIS CLASS HAS NO CAPABILITY FOR ARABLE CULTURE OR SUSTAINED NATURAL GRAZING.

All classified areas not included in Classes 1 to 6 are placed in this class. Class 7 land may have limitations equivalent to Class 6 land but they do not provide natural forage for sustained grazing by domestic livestock due to climate and resulting unsuited natural vegetation. Also included are rockland, other nonsoil areas, and small water-bodies not shown on the maps. Some unimproved Class 7 lands can be improved by draining, diking and/or irrigation.

5. LAND CAPABILITY SUBCLASSES FOR MINERAL SOILS

Mineral soil is defined as the naturally occurring, unconsolidated mineral material at least 10 cm thick that occurs at the earth's surface and is capable of supporting plant growth. Included are unconsolidated mineral materials covered by 60 cm or less of water throughout the year and unconsolidated mineral materials overlain by less than 60 cm of fibric organic material or by less than 40 cm of mesic or humic organic material. Peaty phases of mineral soils (organic surface layer at least 15 cm thick) are assessed on the depth and characteristics of the unconsolidated mineral component.

The subclass indicates lands with similar kinds but varying intensities of limitations and hazards. It provides information on the kind of management problem or use limitation. Except for Class 1 which has no significant limitations, the capability classes are divided by subclasses on the basis of type of limitation to agricultural use. Each class can include many different kinds of soil, similar with respect to degree of limitation; but soils in any class may require unlike management and treatment as indicated by the subclasses shown. Subclass definitions and their corresponding map symbol (in parentheses), and guidelines for determining class designation under both unimproved and improved conditions follow.

Soil moisture deficiency (A): This subclass is used where crops are adversely affected by droughtiness either through insufficient precipitation or low water holding capacity of the soil. This limitation is determined for all lands subject to soil moisture deficits (SMD) during the growing season, i.e. commonly the imperfectly or better drained soils. The following guidelines suggested for class designation are based on soil moisture deficits determined for the upper 50 cm of mineral soil (Refer to the section "Determination of Soil Moisture Deficit", pg. 45). The range of SMD within each class is equivalent to the range of climatic moisture deficit (CMD) within each class in the "Climatic Capability Classification for Agriculture in British Columbia", (Climatology Unit, 1981).

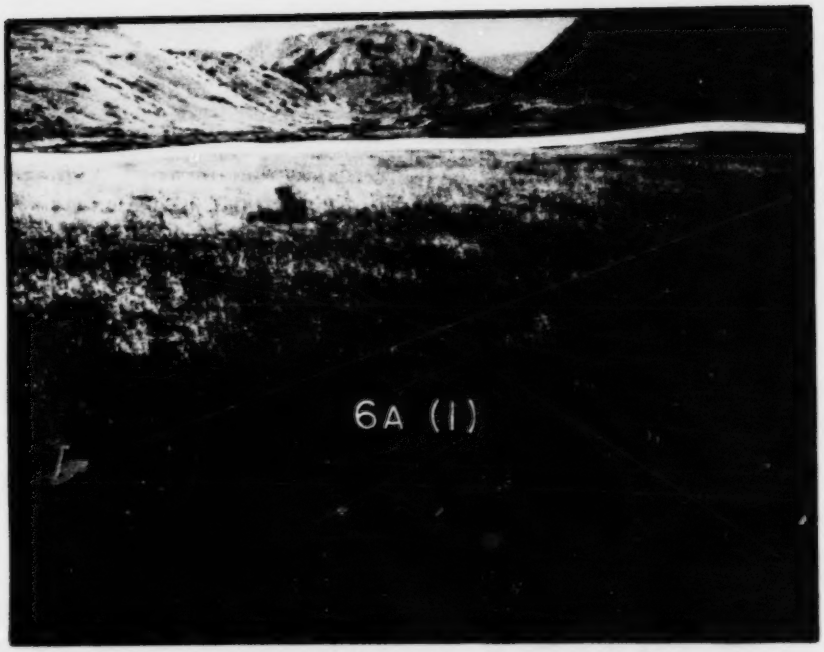

Plate 3. Climatic aridity in the Okanagan Valley limits the use of this land to natural grazing, Class 6A. With irrigation it would improve to Class 1, prime agriculture land.

Plate 4. Cool climate in the Burns Lake-Vanderhoof area, Class 4C, limits the range of crops. However forages, some cereals and cool season loving vegetables can be grown.

CLASS 1 : SMD is less than 40 mm.

CLASS 2A: SMD is from 40 to 115 mm.

CLASS 3A: SMD is from 116 to 190 mm.

CLASS 4A: SMD is from 191 to 265 mm.

CLASS 5A: SMD is from 266 to 340 mm.

CLASS 6A: SMD is from 341 to 415 mm and the land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 7A: SMD is greater than 340 mm. The land in its present condition is not useable for either arable agriculture or sustained natural grazing for domestic livestock.

The Unimproved Rating is to be determined on CMD corrected to SMD based on the available water storage capacity (AWSC) of the upper 50 cm of soil. For soils with low AWSC's, a limit to their best possible ratings has been defined regardless of the CMD, as follows:

AWSC (upper 50 cm)	Definitive Soil Texture	Best Unimproved Rating
>76 mm	fine sandy loam or finer	1
61-75 mm	sandy loam	2A
45-60 mm	loamy sand to coarse sandy loam	3A
25-44 mm	sand to coarse loamy sand	4A
10-24 mm	very gravelly sand	5A
<10 mm	gravel	6A or 7A depending on whether or not the land has sustained natural grazing potential

Soil moisture deficiency is improvable through irrigation. The Improved Rating takes irrigation into account. In terms of management and water requirements, soils with low AWSC's are still somewhat limiting even when irrigated. From past experience in assessing irrigated ratings for agricultural capability the following guidelines are suggested for determining the improved rating due to irrigation. It is based on the AWSC of the upper 50 cm of mineral soil.

AWSC (upper 50 cm)	Definitive Soil Texture	Best Improved Rating
>60 mm	sandy loam or finer	1
45-60 mm	loamy sand to coarse sandy loam	2A
25-44 mm	sand to coarse loamy sand	3A
10-24 mm	very gravelly sand	5A
<10 mm	gravel	no improvement

Adverse climate (C): This subclass is used on a subregional or local basis and is derived from 1:100 000 scale "Climatic Capability for Agriculture" maps (see "Thermal Limitations" pg. 43). It indicates thermal limitations to agricultural capability including the adverse affect on plant growth during the growing season by minimum temperatures near freezing and/or insufficient heat units, and/or, extreme minimum winter temperatures which injure or kill dormant or near dormant fruit trees.

Improvement of adverse climate due to thermal limitations is not considered practical. The Improved Rating is equivalent to the Unimproved Rating.

Undesirable soil structure and/or low perviousness (D): This subclass is used for soils difficult to till, requiring special management for seedbed preparation and soils with trafficability problems for common farm implements. Also included are soils which have insufficient aeration, absorb and distribute water slowly, or have the depth of rooting zone restricted by conditions other than wetness (high water table) or consolidated bedrock or permafrost.

The guidelines suggested for class designations are based on texture, structure, consistence, permeability (hydraulic conductivity of disturbed samples in the laboratory) and depth to root restricting layer. These restricting layers may include clay enriched horizons, compact soil parent materials, cemented horizons, horizons with massive structure, or horizons with weak structure and firm to very firm consistency. Soils with good tilth in the upper 25 cm may be rated one class better than the guidelines indicate. Tilth

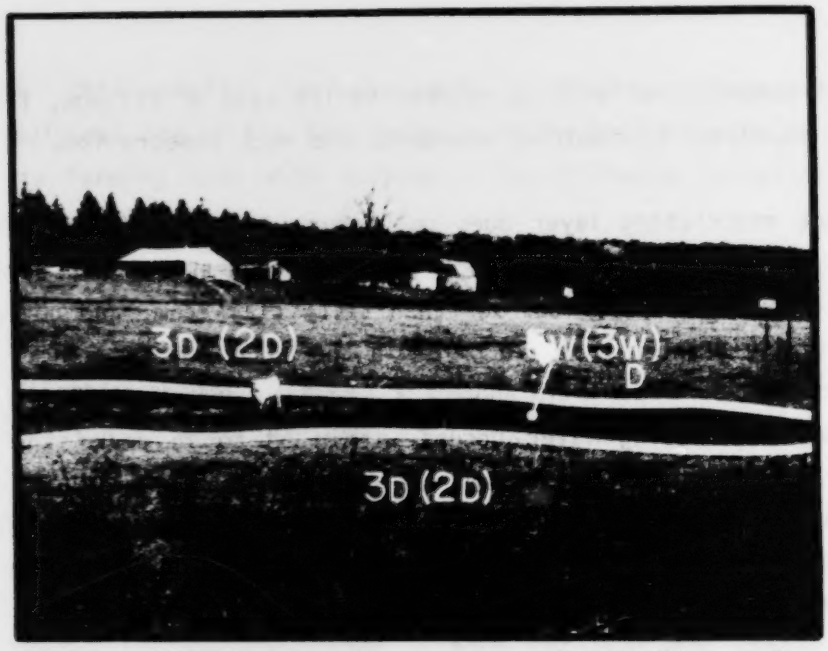

Plate 5. Undesirable soil structure of this fine marine soil limits the land capability to Class 3. Excess water limits the capability of the depression to Class 5.

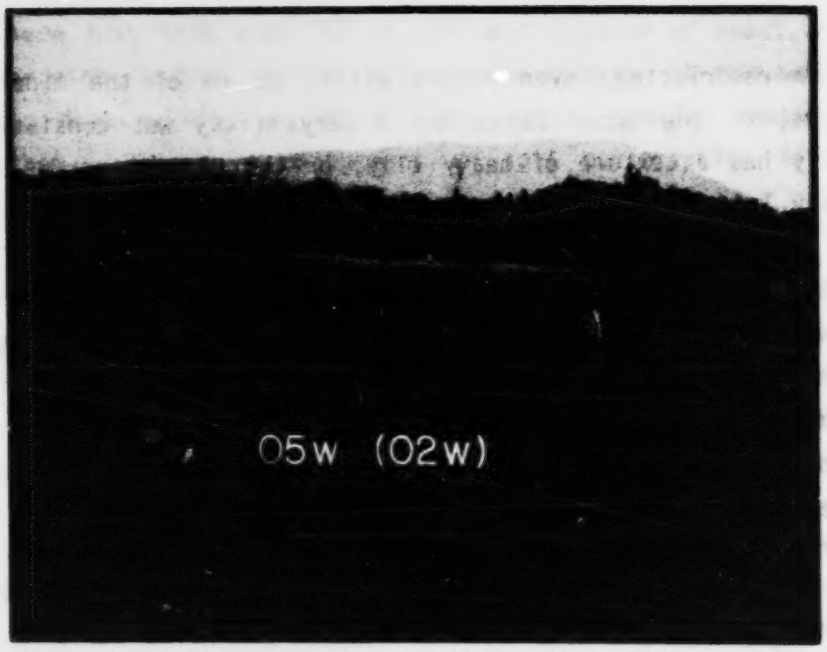

Plate 6. In it's present condition this organic land is capable of forage production, Class 05. With drainage, improvement to Class 02 can be expected.

is the physical condition of soil as related to its ease of tillage, fitness as a seedbed, and impedance to seedling emergence and root penetration.

CLASS 1 : A root restricting layer does not occur within 75 cm of the mineral soil surface, and the upper 25 cm has a non-sticky wet consistence and a texture usually coarser than silty clay loam, and permeability is usually greater than 1.0 cm/hr in the upper 100 cm.

CLASS 2D: A root restricting layer occurs within 50 to 75 cm of the mineral soil surface, or the upper 25 cm has a slightly sticky wet consistence and usually has a texture of silty clay loam, clay loam or sandy clay, or the slowest permeability is usually 0.5 to 1.0 cm/hr in the upper 100 cm.

CLASS 3D: A root restricting layer occurs within 25 to 50 cm of the mineral soil surface, or the upper 25 cm has a sticky wet consistence and usually has a texture of silty clay or clay, or the slowest permeability is usually 0.15 to 0.5 cm/hr in the upper 100 cm.

CLASS 4D: A root restricting layer occurs within 25 cm of the mineral soil surface, or the upper 25 cm has a very sticky wet consistence and usually has a texture of heavy clay, or the slowest permeability is usually less than 0.15 cm/hr in the upper 100 cm.

Some features of undesirable soil structure and/or low perviousness are improvable to varying degrees (amelioration of soil texture, deep ploughing or blading to break-up root restricting layers); others, such as strongly cemented horizons, are not. The Improved Rating for this subclass, if indicated, should be determined on the basis of past experience with improving comparable soils. If such experience is not available no improvement is assumed and the Improved Rating is equivalent to the Unimproved Rating.

Erosion (E): This subclass includes soils on which past damage from erosion limits agricultural use of the land because of the loss in productivity and the difficulty in farming land with gullies. The following guidelines for class designations are suggested.

CLASS 1 : Not eroded to very slightly eroded.

CLASS 2E: Slightly eroded. There is enough evidence of sheet, rill or wind erosion to require minor management or soil conservation practices.

CLASS 3E: Moderately eroded. Up to 25% of the original solum has been lost from over 50% of the area because of sheet, rill or wind erosion, and/or shallow gullies may be present that could be filled during normal tillage operations without the need for special equipment. Continuous management or soil conservation practices are required to prevent accelerated erosion.

CLASS 4E: Severely eroded. Approximately 25 to 50% of the original solum has been lost from over 75% of the area because of sheet, rill or wind erosion, and/or shallow gullies are common. A few moderately deep to deep gullies may occur that require special equipment to fill them. Intensive management or soil conservation is required to prevent increased erosion.

CLASS 5E: Very severely eroded. Approximately 50 to 75% of the original solum has been lost from over 75% of the area because of sheet, rill or wind erosion, and/or shallow gullies are very common and moderately deep and deep gullies occur frequently. Gullies are impractical to improve but further gully development should be arrested. Farm machinery can be operated on Class 5 land.

CLASS 6E AND CLASS 7E: Extremely severely eroded. More than 75% of the original solum has been lost from over 75% of the area because of

sheet, rill or wind erosion, and/or the area is dissected by moderately deep to deep gullies with small areas of intact soil between the gullies. Improvements are not feasible and farm machinery cannot be reasonably or safely operated. Class 6 land in its present condition provides sustained natural grazing for domestic livestock but Class 7 land does not.

Erosion is usually a continuing limitation. It is often practical to reduce the affect of present erosion but improvement of the effects of past erosion is not considered. The Improved Rating is equivalent to the Unimproved Rating.

Fertility (F): Soils with this subclass are those limited by fertility characteristics that are either correctable with constant and careful use of fertilizers and/or other soil amendments, or are difficult to correct in a feasible way. The limitations may be due to lack of available nutrients, inadequate (low) cation exchange capacity or nutrient holding ability, high acidity or alkalinity, high levels of carbonates, the presence of toxic elements or compounds, or high fixation of plant nutrients. The limitations are assessed on the rooting zone depth (upper 50 cm of mineral soil) unless otherwise stated. Limitations due to salinity are not considered in this subclass.

CLASS 1 : Soils are well supplied with nutrients easily and continuously available to plants. Fertility status neither restricts the range or productivity of a wide range of crops.

CLASS 2F: Includes both, soils with minor fertility limitations in the upper 50 cm, such as minor nutrient imbalances, inadequate exchange capacity or nutrient holding ability, or moderate acidity or alkalinity, and/or soils with moderate to severe fertility problems below the 50 cm depth. Fertility status does not restrict the range of crops, but routine additions of fertilizer and/or other soil

amendments are required to maintain productivity for a wide range of crops (Improved Rating is Class 1).

CLASS 3F: Includes soils with moderate nutrient imbalances, low cation exchange capacity or nutrient holding ability, high acidity or alkalinity and/or high levels of carbonates. Fertility status does not restrict the range of crops, but moderate, ongoing additions of fertilizer and/or other soil amendments are required to maintain productivity for a wide range of crops (Improved Rating is Class 1).

CLASS 4F: Includes soils with severe nutrient imbalances, very low cation exchange capacity or nutrient holding ability, very high acidity or alkalinity, very high levels of carbonates and/or high fixation of plant nutrients. Fertility status significantly restricts the range of crops, but with intensive and judicious applications of fertilizers and/or other soil amendments, productivity for a wide range of crops is attainable. (Improved Rating is Class 1, or Class 2F if improvement results in lower crop yields than common for Class 1 lands).

CLASS 5F: Includes soils with very severe nutrient imbalances, extreme acidity or alkalinity and/or extremely high levels of carbonates. Fertility status restricts the range of crops to perennial forages or other specially adapted crops such as cranberries. With very intensive, closely controlled and carefully monitored applications of fertilizers and/or other soil amendments, these soils are improvable in crop range, climate permitting. If expected crop range upon improvement is wide the Improved Rating is 2F, otherwise 3F.

CLASS 6F: Soils in which the very poor fertility status is unsuited for agricultural crops and is impractical to improve with feasible management practices. Specially adapted native plant species are present which are suitable for grazing by domestic livestock.

CLASS 7F: Soils which contain elements or compounds toxic to vegetation, or support plants poisonous to animals which cannot be removed with feasible management practices.

Inundation (I): This subclass includes soils where overflow by streams, lakes or marine tides causes crop damage or restricts agricultural use. The following criteria based on relative hazard or increasing limitation to plant growth are suggested for class designation.

CLASS 1 : Soils are not subject to damaging overflow.

CLASS 2I: Soils are subject to occasional, very brief (1 day) inundation during the growing period causing slight crop damage, or the occurrence of winter inundation causing high water tables affecting only deep-rooted perennial crops.

CLASS 3I: Soils are subject to frequent, brief (2 days) overflow during the growing period causing minor crop damage but no crop loss, and/or are flooded until mid-spring forcing late seeding and adversely affecting perennial crops during the winter months.

CLASS 4I: Soils are subject to either frequent or extended overflow during the growing period causing moderate crop damage and occasional crop loss, or are flooded until late spring preventing seeding in some years.

CLASS 5I: Soils are subject to frequent overflow of extended duration (7 days or more) during the growing period or are flooded until early summer making the land suitable only for perennial forage crops and/or improved pasture. Effective grazing period is longer than 10 weeks.

CLASS 6I: Extended flooding (>6 weeks) and/or very frequent overflow during

the growing season with effective natural grazing period of 5 to 10 weeks.

CLASS 7I: Flooded for most of the growing season; not useable for agriculture.

Inundation can be prevented by diking and no further hazard is assumed to exist. The Improved Rating for this subclass in such a case is CLASS 1. Any hazard or limitation expected to continue after diking due to high water tables is indicated by the Subclass W (excess water). Note that lands with Unimproved Ratings of 6I or 7I are improvable by diking.

Salinity (N): This subclass includes soils adversely affected by soluble salts which reduce crop growth or restrict the range of crops that may be grown. The following guidelines for class designation are suggested. The salt content is expressed as the electrical conductivity of the extract from a water-saturated paste.

CLASS 1 : No limitations to crop growth or range of crops. Soils have low (<2 mS/cm) salt content from 0 to 100 cm.

CLASS 2N: Only salt sensitive crops are adversely affected. Soils have low (<2 mS/cm) salt content from 0 to 50 cm and have moderate (2 to 4 mS/cm) salt content from 50 to 100 cm.

CLASS 3N: Most crops are adversely affected. Soils have moderate (2 to 4 mS/cm) salt content from 0 to 50 cm and/or have high to very high (>4 mS/cm) salt content from 50 to 100 cm.

CLASS 4N: Moderate limitation to most crops. Soils have high (4 to 8 mS/cm) salt content from 0 to 50 cm.

CLASS 5N: Salt content is sufficiently severe to preclude most crops, but salt-tolerant forage crops can be established and maintained. Soils have very high (>8 mS/cm) salt content in the 0 to 50 cm depth.

CLASS 6N: Soils are too salty for cultivated crops but support specially adapted, native salt-tolerant plant species, some of which are suitable for grazing by domestic livestock.

CLASS 7N: Soils are too salty for cultivated crops and do not support native plants suitable for grazing or soils which support poisonous plants which cannot be removed with feasible management practices.

There are different reasons for, and types of, salinity problems. Improvement practices and their success in alleviating limitations due to salinity vary depending on site and soil conditions. The Improved Rating for this subclass, if indicated, should be determined on the basis of past experience with improving comparable soils. If such experience is not available no improvement is assumed and the Improved Rating is equivalent to the Unimproved Rating.

Stoniness (P): This subclass applies to soils with sufficient coarse fragments* to significantly hinder tillage, planting, and/or harvesting operations. The suggested guidelines for class designation are based on the sieved proportion of "coarse gravels" (2.5 to 7.5 cm diameter), cobbles (7.5 to 25 cm diameter) and stones (>25 cm diameter) of the total soil in the upper 25 cm of mineral soil.

CLASS 1 : Total coarse fragment content (2.5 cm diameter or larger) offers no or very slight hindrance to cultivation. Total coarse fragment content is 5% or less with cobbles and stones occupying 0.01% or less of the sieved soil.

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* In this case coarse fragments refer to "coarse gravels" plus cobbles plus stones, i.e. fragments 2.5 cm diameter or larger.

CLASS 2P: Total coarse fragment content (2.5 cm diameter or larger) offers only slight hindrance to cultivation. Total coarse fragment content is 6 to 10% or cobbles and stones occupy 0.01 to 1% of the sieved soil.

CLASS 3P: Total coarse fragment content (2.5 cm diameter or larger) causes significant interference with cultivation. Total coarse fragment content is 11 to 20% or cobbles and stones occupy 2 to 5% of the sieved soil.

CLASS 4P: Total coarse fragment content (2.5 cm diameter or larger) is a serious handicap to cultivation. Total coarse fragment content is 21 to 40% or cobbles and stones occupy 6 to 15% of the sieved soil. Note that in areas which are climatically suitable for growing tree fruits and grapes, a CLASS 4 level stoniness limitation may not be a significant limitation to these crops. (Refer to Chapter 10).

CLASS 5P: Sufficient coarse fragments (2.5 cm diameter or larger) are present to prevent sustained cultivation until considerable picking has been done. Total coarse fragment content is 41 to 60% or cobbles and stones occupy 16 to 30% of the sieved soil. Note that in areas which are climatically suitable for growing tree fruits and grapes, a CLASS 5 level Stoniness limitation may not be a significant limitation to these crops. (Refer to Chapter 10).

CLASS 6P: Coarse fragments (2.5 cm diameter or larger) are sufficiently numerous to make impractical the application of improvement practices. Total coarse fragment content is 61 to 90% or cobbles and stones occupy 31 to 80% of the sieved soil. The land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 7P: Coarse fragments (2.5 cm diameter or larger) prevent agricultural

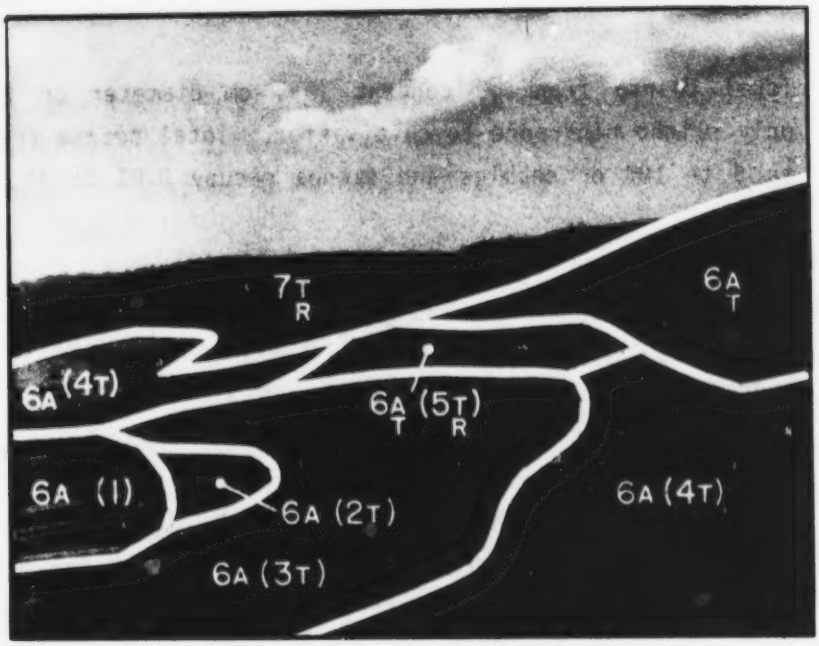

Plate 7. Sequence of topographic limitation at Grand Forks. Topography is the most common limitation in British Columbia.

Plate 8. Stoniness is a common limitation to many lands in British Columbia. Southeast Vancouver Island.

use. Total coarse fragment content is greater than 60% or cobbles and stones occupy more than 30% of the sieved soil. The land in its present condition is not useable for either arable agriculture or sustained natural grazing for domestic livestock.

A stoniness limitation is improvable by removing cobbles and stones, either manually or by mechanical means. "Coarse gravel" is considered impractical to remove and this limitation remains after improvement. The Improved Rating is determined by assessing the characteristics of the soil, including proportion of "coarse gravels" to cobbles and stones, size of cobbles and stones, and distribution of coarse fragments in the soil. Because of the possible continuing nature of this limitation by plowing or frost action bringing coarse fragments to the soil surface, the general suggested guidelines for Improved Rating designation are: improvement is at most two classes from the Unimproved Rating, but generally by only one class. If the Unimproved Rating is a poor Class 5, no improvement from the Unimproved Rating may be considered feasible.

Depth to solid bedrock and/or rockiness (R): This subclass is used for soils in which the presence of bedrock near the surface restricts rooting depth and tillage and/or the presence of rock outcrops (includes bedrock covered by less than 10 cm of mineral soil) restricts agricultural use.

CLASS 1 : Depth to solid bedrock is greater than 1 m and rock outcrops are greater than 75 m apart.

CLASS 2R: Depth to solid bedrock is 75 to 100 cm and rock outcrops are greater than 75 m apart.

CLASS 3R: Depth to solid bedrock is 50 to 75 cm and/or rock outcrops are between 50 and 75 m apart.

CLASS 4R: Depth to solid bedrock is 25 to 50 cm and/or rock outcrops are between 25 and 50 m apart.

CLASS 5R: Depth to solid bedrock is 25 to 50 cm and rock outcrops are between 10 and 25 m apart.

CLASS 6R: Depth to solid bedrock is less than 25 cm and/or rock outcrops are between 2 and 10 m apart. The land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 7R: Depth to solid bedrock is less than 25 cm and/or rock outcrops are less than 10 m apart. The land in its present condition is not useable for either arable agriculture or sustained natural grazing by domestic livestock.

Improvement of limitations due to depth to solid bedrock and/or rockiness are not considered practical. The Improved Rating is equivalent to the Unimproved Rating.

Topography (T): This subclass applies to soils for which topography limits agricultural use by affecting the use of farm machinery, decreasing the uniformity of growth and maturity of crops, and increasing the potential for water erosion. The following suggested class designations are based on percent slope (steepness) and the pattern or complexity of slopes. Both steepness and the pattern of slopes affect the use of farm machinery, and the pattern of slopes affects crop maturation. Microtopography (small hummocks and depressions) is not considered a limitation to agricultural use and is assumed to be eliminated during the process of land-clearing.

CLASS 1 : Simple slopes of 5% or less or complex slopes of 2% or less.

CLASS 2T: Simple slopes varying from 6 to 10% or complex slopes varying from 3 to 5%.

CLASS 3T: Simple slopes varying from 11 to 15% or complex slopes varying from 6 to 10%.

CLASS 4T: Simple slopes varying from 16 to 20% or complex slopes varying from 11 to 15%. Note that in areas which are climatically suitable for growing tree fruits and grapes, a CLASS 4 level Topograghy limitation may not be considered a significant limitation to these crops. (Refer to Chapter 10).

CLASS 5T: Simple slopes varying from 21 to 30% or complex slopes varying from 16 to 30%. Note that in areas which are climatically suitable for growing tree fruits and grapes, a CLASS 5 level Topography limitation may not be considered a significant limiation to these crops. (Refer to Chapter 10).

CLASS 6T: Slopes, either simple or complex, varying from 31 to 60% and the land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 7T: Slopes, either simple or complex, greater than 30%. The land in its present condition is not useable for either arable agriculture or sustained natural grazing by domestic livestock.

Improvement of topographic limitations is considered impractical. The Improved Rating is equivalent to the Unimproved Rating.

Excess water (W): This subclass applies to soils for which excess free water, other than from inundation (flooding), limits their use for agriculture. The excess water occurs because of imperfect to very poor drainage due to high water tables, seepage, or runoff from surrounding areas. The following guidelines for class designation are suggested.

CLASS 1 : Crop damage due to excess water is not a factor.

CLASS 2W: Occasional occurrence of excess water during the growing period causing slight crop damage, or the occurrence of excess water during

the winter months adversely affecting deep rooted perennial crops. Water level is rarely, if ever, at the surface and excess water is within the upper 50 cm for only short periods (less than 2 weeks) during the year.

CLASS 3W: Occasional occurrence of excess water during the growing period causing minor crop damage, but no crop loss, or the occurrence of excess water during the winter months adversely affecting perennial crops. Water level is near the soil surface until mid-spring forcing late seeding, or the soil is poorly and in some cases imperfectly drained, or the water level is less than 20 cm below the soil surface for a continuous maximum period of 7 days during the growing period.

CLASS 4W: Frequent or continuous occurrence of excess water during the growing period causing moderate crop damage and occasional crop loss. Water level is near the soil surface during most of the winter and/or until late spring preventing seeding in some years, or the soil is very poorly drained.

CLASS 5W: Frequent or continuous occurrence of excess water during the growing period making the land suitable for only perennial forage crops, and/or improved pasture. Water level is near the soil surface until early summer, or the maximum period the water level is less than 20 cm below the soil surface is 6 weeks during the growing period, or the soil is very poorly drained, commonly with shallow organic surface layers. Effective grazing period is longer than 10 weeks.

CLASS 6W: Continuous occurrence of excess water during the growing season with an effective natural grazing period of 5 to 10 weeks. The water level is at or above the soil surface except for a short period in mid-summer.

CLASS 7W: Under water most of the growing season; not useable for agriculture.

Water control (ditching or tiling) will generally improve this limitation by at least one class depending on landscape position, and source and type of excess water. The Improved Rating should be assessed on a site specific basis, using regional experience from comparable soils in the area which have been improved. Note that lands with Unimproved Ratings of 6W or 7W can sometimes be improved by draining.

Permafrost (Z): The presence of a cryic (permanently frozen) layer is a severe limitation to agricultural production. In addition to maintaining undesirable cold soil temperatures, drainage problems are complicated when permafrost is present in the upper 150 cm. If permafrost occurs below 150 cm depth from the soil surface, and its depth is unaffected by cultivation, it poses a less severe limitation to agricultural production than it would if it occurred above 150 cm. Because of limited experience regarding the effect of this limitation on agricultural use, partial guidelines for permafrost conditions are suggested as follows.

CLASS 4Z: Permafrost occurs below 150 cm from the soil surface during the growing season and does not interfere with crop production.

CLASS 6Z: Permafrost occurs within 150 cm of the soil surface during the growing season. The land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 7Z: Permafrost occurs within 150 cm of the soil surface during the growing season. The land in its present condition is not useable for either arable agriculture or sustained natural grazing by domestic livestock.

Improvement of permafrost conditions is assumed impractical. The Improved Rating is equivalent to the Unimproved Rating.

6. LAND CAPABILITY CLASSES AND SUBCLASSES FOR ORGANIC SOILS

Organic soils* (not including peaty phases of mineral soils) are grouped into seven classes, designated as 01 to 07. The organic soil class definitions are equivalent in relative capabilities and limitations for agricultural use to those defined for mineral soils.

Subclass definitions and guidelines for class designation are adopted, with modification from "A Use Capability Classification for Organic Soils", Leeson, (1969). They are as follows.

Wood in the profile (B): Layers of wood in the form of trunks, stumps and branches may occur in many organic soils. Any wood located within 50 cm of the surface will probably interfere with cultivation practices within the first three years of operation. Wood occurring in the top 150 cm of the soil will interfere with ditching and drain installation. Some of this wood is well decomposed, soft, crumbles easily and interferes with agricultural operations very little. Other pieces, however, exist as logs, stumps and branches 3 to 5 m long and up to 30 cm in diameter and require removal if they interfere with the operations of machines. In some places, wood layers are so thick and resistant that they exclude any possible development for agriculture. The following criteria are suggested for class designation.

CLASS 01 : Soils are devoid of wood or wood that is present interferes with agricultural operations very slightly.

CLASS 02B: Layer of soft wood (can be crushed between hands) greater than 10 cm thick occurs between 50 and 150 cm of the soil surface.

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* As defined in: Canada Soil Survey Committee. "The Canadian System of Soil Classification". Research Branch, CDA, Publication 1646, 1978.

CLASS 03B: Layer of soft wood greater than 10 cm thick occurs in the upper 50 cm and/or a layer, in which hard wood less than 5 cm in diameter is common, occurs between 50 and 75 cm of the soil surface.

CLASS 04B: Layer in which hard wood less than 5 cm in diameter is common, occurs within 50 cm of the soil surface and/or a layer in which hard wood greater than 5 cm in diameter is common, occurs between 50 and 75 cm of the soil surface.

CLASS 05B: Layer in which hard wood greater than 5 cm in diameter is common, occurs within 50 cm of the soil surface.

CLASS 06B: Layers of wood totalling more than 30 cm in thickness and occurring within the top 150 cm of the soil. The land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 07B: Layers of wood totalling more than 30 cm in thickness and occurring within the top 150 cm of the soil. The land in its present condition is not useable for either arable agriculture or sustained natural grazing by domestic livestock.

Because of the variability of this limitation, its probable continuing nature even after improvement, and the limited experience regarding its improvement, the Improved Rating, if indicated, should be determined on the basis of past experience with improving comparable soils. If such experience is not available no improvement is assumed and the Improved Rating is equivalent to the Unimproved Rating.

Climate (C): Same as for mineral soils.

Depth of organic soil over bedrock and/or rockiness (H): This subclass includes organic soils for which the presence of bedrock near the surface restricts depth of rooting and the feasibility of subsurface drainage, and/or the presence of rock outcrops restricts agricultural use. The following criteria are suggested for class designation.

CLASS 01 : Depth of organic soil over solid bedrock is greater than 180 cm with no rock outcrops.

CLASS 02H: Depth of organic soil over solid bedrock is greater than 180 cm and rock outcrops are greater than 75 m apart.

CLASS 03H: Depth of organic soil over solid bedrock is greater than 180 cm and rock outcrops are 50 to 75 m apart.

CLASS 04H: Depth of organic soil over solid bedrock is 150 to 180 cm and/or rock outcrops are 25 to 50 m apart.

CLASS 05H: Depth of organic soil over solid bedrock is 120 to 150 cm and/or rock outcrops are 10 to 25 m apart.

CLASS 06H: Depth of organic soil over solid bedrock is 90 to 120 cm and/or rock outcrops are 2 to 10 m apart. The land in its present condition provides sustained natural grazing for domestic livestock.

CLASS 07H: Depth of organic soil over solid bedrock is less than 120 cm and/or rock outcrops are less than 10 m apart. The land in its present condition is not useable for either arable agriculture or sustained natural grazing by domestic livestock.

Improvement of limitations due to bedrock near the surface and/or rockiness is not considered practical. The Improved Rating is equivalent to the Unimproved Rating.

Fertility (F): Same as for mineral soils.

Inundation (I): Same as for mineral soils.

Degree of decomposition - permeability (L): The degree of decomposition of the rooting zone is probably of less importance to the overall agricultural capability than that of the lower part of the soil. The surface 30 cm, because it will be drained, cultivated, aerated and fertilized, will experience active microbial degradation of the organic constitutents. As a result, it will probably approach a stage of advanced decomposition within three to four years of successive cropping. The degree of decomposition of the sublayers is important, however, because it will have a continuing effect on the drainage, permeability, capillary rise of water and rate of subsidence. Also considered in the criteria for class designations is aquatic muck, a highly decomposed, saturated organic material with a porridge-like consistency when wet. Muck is virtually impermeable when undisturbed and oozes if machines are operated in it.

The occurrence of cumulo or continuous layers of mineral soil in an organic profile poses a hazard to optimum crop yield and to drainage. The degree of limitation caused by mineral layers is dependent on the type of material and the thickness of the layer. The following guidelines are suggested for class designation.

CLASS 01 : Mesic soil is continuous in the 30 to 150 cm depth and no cumulo mineral layers greater than 5 cm thick occur in the upper 150 cm of the organic profile.

CLASS 02L: Dominantly mesic soil in the 30 to 150 cm depth and/or a cumulo or continuous layer of sandy soil greater than 5 cm thick occurring in the upper 150 cm.

CLASS 03L: Dominantly humic or fibric soil in the 30 to 150 cm depth and/or aquatic muck greater than 5 cm thick in the 100 to 150 cm depth of the profile and/or a cumulo or continuous layer of loamy soil greater than 5 cm thick occurring in the upper 150 cm.

CLASS 04L: Aquatic muck greater than 5 cm thick occuring within 100 cm of the surface and/or a cumulo or continuous layer of clayey soil or marl greater than 5 cm thick occurring in the upper 150 cm.

Improvement of this limitation is not considered practical. The Improved Rating is equivalent to the Unimproved Rating.

Salinity (N): Same as for mineral soils.

Excess water (W): Same as for mineral soils.

Permafrost (Z): Same as for mineral soils.

7. UNIMPROVED AND IMPROVED RATINGS

This classification provides that most lands are given two ratings - one for unimproved conditions, and one for improved conditions. Class 6 and 7 lands are not considered improvable. They are given only unimproved ratings, except in the cases of excess water (W), soil moisture deficiency (A), or inundation (I) limitations where drainage, irrigation and/or diking may be able to improve Class 6 and 7 lands.

Unimproved ratings are based on the conditions that exist at the time of the survey or on-site inspection, without irrigation. Past improvements are assessed as part of the unimproved rating. Forested lands are assessed as if cleared. The following agricultural practices are assumed: tillage, routine fertilizing and liming, planting or seeding, and harvesting the crop.

Improved ratings indicate the capability after existing limitations and/or hazards have been adequately alleviated. Improvements which are to be considered include drainage, irrigation, diking, stone removal, salinity alleviation, subsoiling and/or the intensive addition of fertilizers or other soil amendments.

When assessing improved ratings irrigation water is assumed to be available in all areas where the "Climate Capability Classification for Agriculture" indicates moisture regime limitations more severe than thermal limitations. Inundation is assumed to be controlled by diking. Guidelines for determining adequate levels of improvement for existing limitations and/or hazards are provided with the subclass descriptions. These guidelines are to be used with site specific assessments to determine the extent to which improvements can increase the land capability for agriculture and the range of crops.

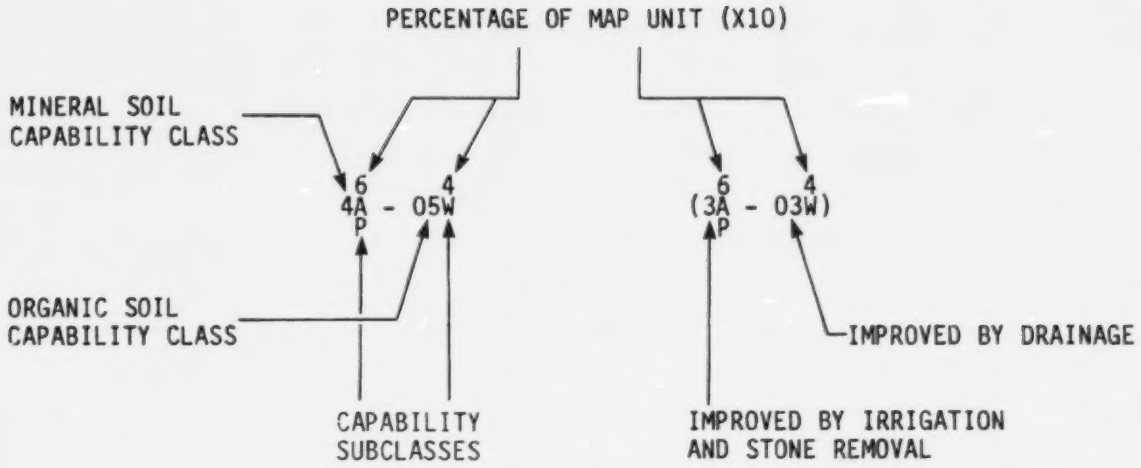
On detailed survey maps, where one delineation may encompass a number of fields with different levels of improvement on the same soil, the Unimproved

Rating indicates the rating with no improvement. The Improved Rating indicates the best capability possible due to adequate levels of improvement.

8. MAP SYMBOL CONVENTIONS

The following conventions are recommended for application of the Land Capability Classification for Agriculture in British Columbia.

1) Arabic numerals denote the capability classes and small capital letters placed after the class numerals denote the subclasses.
2) A subclass is shown only when the limitation it represents is either at or one class less severe than the class level indicated. Only one of the less severe limitations is to be shown and is placed below the limitation(s) determining the class level. For example, the rating $5^{\text{P}}_{\text{A,T}}$ indicates stoniness and soil moisture limitations at the Class 5 level. The topography limitation is either at the Class 5 or 4 level. However, on published or manuscript maps no more than two subclasses are to be shown.
3) Limitations have no cumulative effect. That is, the class level indicated is to be no worse than the class level determined by the most limiting subclass. For example, if land being rated has a Class 4 level climate limitation and a Class 4 level topography limitation, the capability rating is 4_{C}, not 5_{C}.
4) In map delineations comprising more than one class, small superscript arabic numerals denote the proportion of each class present out of a total of 10. The classes are written in order of dominance with the most dominant class first. Up to three class symbols are allowed in delineations with three very contrasting soils, otherwise one or two is preferable.
5) The improved rating for a delineation is identified in parentheses. All improvements are considered in the one rating, a loss or change in a subclass rating indicates the improvements considered.
6) An example of a typical map symbol follows:



Explanation:

Under unimproved conditions this map unit consists of 60% Class 4 mineral soil with soil moisture deficiency (A) and stoniness (P) limitations, and 40% Class 5 organic soil with frequent or continuous occurrence of excess water (W) during the growing season. The improved rating indicates that with irrigation and stone picking the mineral soil improves to Class 3, and with drainage the organic soil improves to Class 03. Soil moisture deficiency, stoniness and excess water continue as limitations.

9. CLIMATE

The capability of a unit of land for agricultural production is dependent upon the combined influence of local climate and soils. Climate determines the absolute range of crops capable of being grown on a particular piece of land. The soils influence which crops in this range are most suitable and the level of management required for acceptable levels of production.

9.1 Climatic Capability for Agriculture

Climatology Unit (1981), details a system of classification which describes the agricultural capability in terms of climate alone. Climatic Capability for Agriculture ratings (prepared by the Air Studies Branch, Ministry of Environment), commonly presented on maps at a scale of 1:100 000, are based on the above classification. These ratings, together with soils data, and when available, more specific climate data, provide the input for Land Capability for Agriculture maps.

The Climatic Capability for Agriculture maps have two ratings (symbols) per map deliniation. The first symbol indicates that capability class as determined by the moisture regime limitations. The second symbol (shown in parenthesis on the map) indicates the capability class as determined by thermal limitations. The improved climate capability rating (lands being irrigated or drained) is synonymous with the class representing the thermal limitations since it is assumed that the moisture limitations are eliminated. The unimproved climate rating is determined by the most severe limitation imposed by the moisture and/or thermal criteria.

9.2 Thermal Limitations

Thermal limitations are represented by the following subclasses on Climatic Capability for Agriculture maps.

Subclass E - Occurrence of extreme minimum temperatures during the winter season which injure or kill dormant or near dormant fruit trees.

Subclass F - Occurrence of minimum temperatures near freezing adversely affecting plant growth during the growing season.

Subclass G - Insufficient heat units during the growing season.

For determining Land Capability for Agriculture ratings for the subclass adverse climate (C), the above thermal limitations are considered. The relative degree of the adverse climate limitation (i.e. the class level) is synonymous with the thermal limitation class level. For example, the thermal limitations represented by (3GF) in the Climatic Capability for Agriculture system would be represented by 3C in the Land Capability for Agriculture method, if it is the most limiting subclass.

In the Land Capability for Agriculture classification, improvement of adverse climate is not considered practical. The Improved Rating is equivalent to the Unimproved Rating.

9.3 Moisture Limitations

Moisture Limitations are represented by the following subclasses on Climatic Capability for Agriculture maps.

Subclass A - Drought or aridity occurring between May 1st and September 30th resulting in moisture deficits which limit plant growth.

Subclass Y - Excess precipitation between May 1st and September 30th may cause flooding, poor trafficability and generally poor yield and harvest conditions.

For determining Land Capability for Agriculture ratings for Subclass A (soil moisture deficiency), the climatic moisture limitation represented by subclass A on Climatic Capability for Agriculture maps is considered. The climatic moisture deficit (CMD) criterion is used for determining this climatic limitation.

Subclass A (soil moisture deficiency) is based on soil moisture deficit (SMD). SMD is determined by subtracting the available water storage capacity (AWSC) of the upper 50 cm of soil from the CMD. (Note that Climatology Unit (1981) defines CMD as a negative number. For the purposes of this report the absolute value of negative CMD values are used in all calculations.) The CMD figure to be used in this calculation is the midpoint of the CMD class given on the Climatic Capability for Agriculture map, unless more specific CMD data is available. Note that for soils with low AWSC, a limit to their best possible ratings has been defined regardless of CMD (Refer to Soil moisture deficiency (A), pg. 13).

On earlier Climatic Capability for Agriculture maps the CMD was calculated to include 254 mm (10 in.) of water to represent an assumed maximum available water storage capacity for 1.2 m depth of soil. When using these maps the CMD must be corrected for this, then proceed as above. It is recommended that users confer with climatologists in the Air Studies Branch before adjusting these earlier maps since it is mathematically impossible for the user to adjust for AWSC when the value of precipitation minus potential evapotranspiration is less than 254 mm.

The climatic moisture limitation represented by Subclass Y is not directly assessed when determining Land Capability for Agriculture ratings. The effects of excess precipitation between May 1st and September 30th is accounted for by Subclasses W (excess free water) and I (inundation).

9.4 Determination of Soil Moisture Deficit

For the purpose of this classification, soil moisture deficit (SMD) represents the difference between the climatic moisture deficit (CMD)* and the

* Climatology Unit (1981) defines the climatic moisture deficit (CMD) as any negative difference between precipitation (P) and the potential evapotranspiration (PE) from May 1st to September 30th. Note that for the purposes of this report the absolute value of negative CMD values are used in all calculations.

water available in the upper 50 cm of soil at the start of the growing season (if known). Assuming the soil profile is at field capacity at the start of the growing season, SMD equals CMD minus the available water storage capacity of the upper 50 cm of soil, i.e. SMD = CMD - AWSC. In some areas and in some years the soil may not satisfy this assumption because of early freezing of the soil and insufficient recharge between the summer moisture deficit period and freezeup.

The capacity of a soil to store water is mainly dependent upon soil texture and soil structure. AWSC is a measure of this capacity. The total AWSC is obtained by adding the AWSC of the different textural layers present in the upper 50 cm of soil, with adjustment for coarse fragment content. To obtain the best estimate of AWSC, undisturbed soil samples for laboratory analyses of each textural layer in the upper 50 cm are required. In cases where laboratory results are not available, the following estimate of AWSC based on texture should be used.

Textural Class	AWSC(mm/cm)
Sand (medium)	.8
Loamy Sand	1.0
Sandy Loam	1.2
Fine Sandy Loam	1.4
Loam	1.7
Silt Loam	2.1
Clay Loam	2.0
Clay	2.0
Organic Soils (muck)	2.5

(derived from British Columbia Irrigation Committee, 1980)

In the Appendix are two sample calculations of AWSC and the unimproved and improved ratings for the Land Capability for Agriculture soil moisture deficiency limitation represented by subclass A.

10. MODIFIED LAND CAPABILITY CLASSIFICATION FOR TREE FRUITS AND GRAPES

The land capability classification described in the preceeding chapters pertains to common field crops and may not suit well those areas where agriculture is based on some other crops. The growing of so-called specialty crops represents the most important agricultural endeavour in a number of regions in Canada.

The Okanagan and Similkameen Valleys were recognized as such from the beginning of CLI Capability Classification for Agriculture. Tree fruits and grapes are the mainstay of agriculture in these valleys and cannot be treated as specialty crops. The modified capability classification, used in the Okanagan - Similkameen, is based on the land suitability to grow fruit trees or grapes. It was applied in all areas of the Okanagan - Similkameen region climatically suited to fruit trees and grapes.

In the areas designated in Figure 1, including the Okanagan Valley from Armstrong to Osoyoos, Similkameen Valley from Hedley to the U.S.A. border, and the area around Creston, the Modified Land Capability Classification for Tree Fruits and Grapes will continue to be used. Other areas in the province such as the Saanich Peninsula, parts of the east coast of Vancouver Island, and areas in and/or near the Fraser Valley, Salmon Arm, Kamloops, Ashcroft and Lillooet, where some tree fruits and grapes are grown, might in the future be designated as additional areas for application of the modified land capability classification.

Tree fruits and grapes can be grown successfully on steeper and stonier land than the common field crops. Therefore, in the Modified Land Capability Classification for Tree Fruits and Grapes, topography and stoniness limitations are not considered to be as severe for the production of these crops as they are for the production of most common crops. These limitations are rated less severely with the class range being wider in the modified classification. The range of five arable land classes (Classes 1 to 5) in the standard

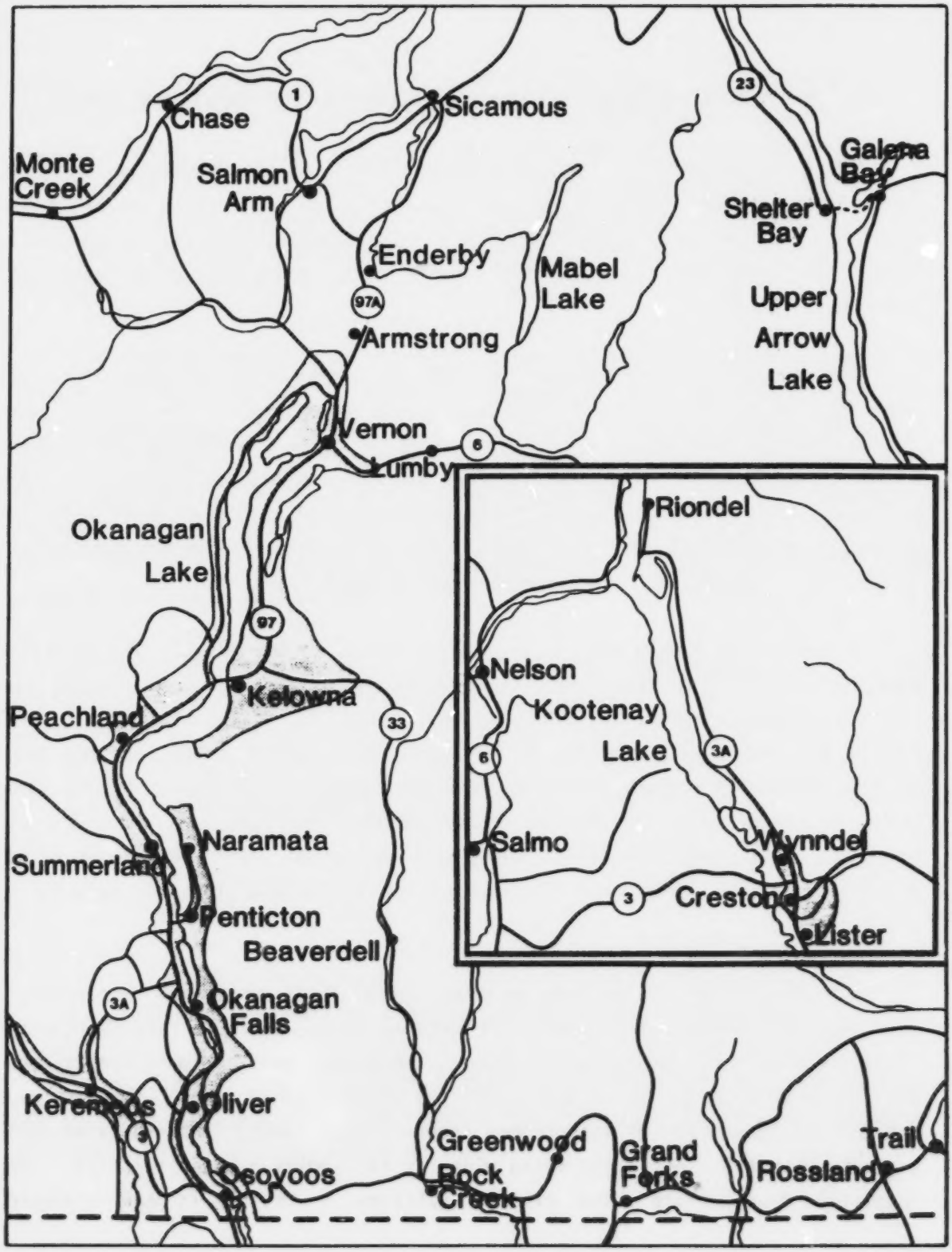


Figure 1 Area in which Modified Land Capability Classification for Tree Fruits and Grapes is to be considered.

classification is reduced to three, designated as Classes *1 to *3. The asterisk (*) prescript to the class designation indicates the modified topography and/or stoniness classes have been used. Only improved ratings are indicated in areas where the modified classification is used but the ratings should still be enclosed in parentheses. Class 6 and 7 lands are designated as per the standard classification. Note that the class sequence of *1 to *3 does not indicate any change in range of fruit trees or grapes that can be grown, but rather indicates the increased physical limitations of the land (steeper and/or stonier) that have to be overcome by the management input.

The following steps outline the use of the Modified Land Capability Classification for Tree Fruits and Grapes.

STEP 1: Determine whether the land to be classified occurs within the designated area in which the modified classification is to be considered (see Figure 1). If yes, then proceed to Step 2.

STEP 2: To determine whether the modified classification is to be applied requires an assessment of both climate and soils. If the subject area occurs in a climate suitable for the growing of tree fruits and grapes the following modified guidelines for determining <u>stoniness</u> and <u>topography</u> class designations under improved conditions are to be applied. The class designations for other soil limitations remain as defined in Chapter 5.

<u>Topography</u> (T): Steepness of the land does not affect the growing of tree fruits and grapes to the same extent as other field crops, but it still has an important bearing on the orchard or vineyard management. The following class designations are based on percent slope and the pattern or complexity of slopes. Both the steepness and the pattern of slopes affect the use of farm machinery.

CLASS *1 : Simple slopes 0 to 10% or complex slopes 0 to 5%.

CLASS *2T: Simple slopes 11 to 15% or complex slopes 6 to 10%.

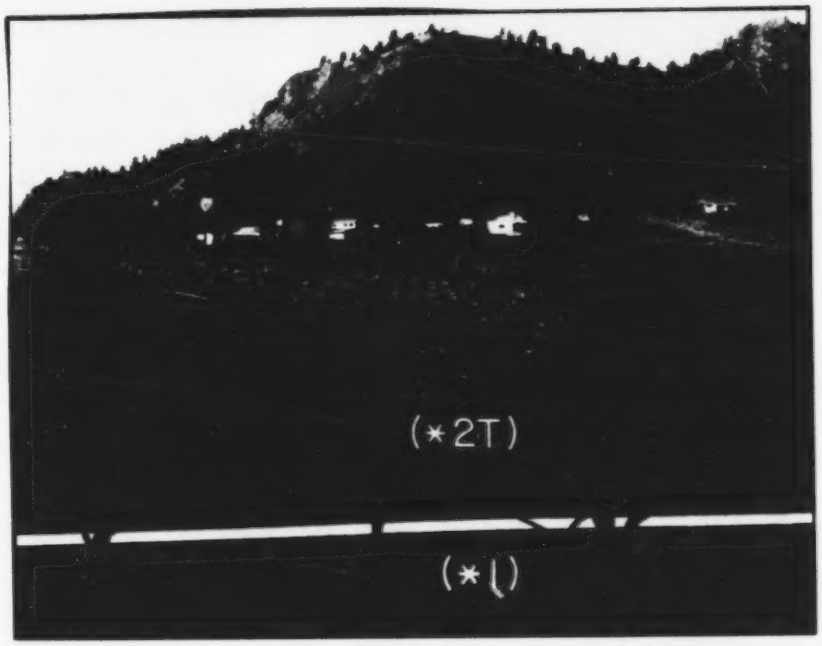


Plate 9. An Okanagan orchard on 13 percent slope, rated Class *2. Class *1 in the foreground.

Plate 10. An Okanagan vineyard on 20 to 30 percent slopes, rated Class *3.

CLASS *3T: Simple slopes 16 to 30% or complex slopes 11 to 30%.

Stoniness (P): The guidelines for class designation are based on the sieved proportion of "coarse gravels" (2.5 to 7.5 cm diameter), cobbles (7.5 to 25 cm diameter) and stones (25 cm + diameter) of the total soil in the upper 25 cm of mineral soil.

CLASS *1 : Total coarse fragment content (2.5 cm diameter or larger) offers no or only slight hindrance to cultivation. Total coarse fragment content is 0 to 10 % with cobbles and stones occupying 0 to 1% of the sieved soil.

CLASS *2P: Total coarse fragment content (2.5 cm diameter or larger) causes significant interference with cultivation. Total coarse fragment content is 11 to 20% or cobbles and stones occupy 2 to 15% of the sieved soil.

CLASS *3P: Total coarse fragment content (2.5 cm diameter or larger) is a serious to very serious handicap to cultivation or sustained cultivation might not be possible (after planting, the orchard or vineyard would be kept grassed). Total coarse fragment content is 21 to 60% or cobbles and stones occupy 16 to 30% of the sieved soil.

Lands within the designated area, but with climate unsuitable for tree fruit and grape production, are assessed for topography and stoniness limitations according to the standard classification as described elsewhere in this manual.

Soil limitations (other than stoniness and topography) as outlined previously in this manual are considered to have similar effects on tree fruits and grapes as they have for common field crops and the standard guidelines for improved class designation apply.

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APPENDIX 1

SAMPLE CALCULATIONS OF AWSC

Example 1

The soil is of good tilth and moderately well drained with 50 cm of silt loam containing no coarse fragments. The Climatic Capability for Agriculture rating is 4A. No other limitations are apparent.

i) The soil is not poorly or very poorly drained, thus considering the climatic aridity (4A), a soil moisture deficiency may occur.

ii) Stoniness is not a consideration.

iii) The CMD range for 4A in the Climatic Capability for Agriculture classification is 191 to 265 mm. Note that the range of SMD within each soil moisture deficiency class (refer to Soil moisture deficiency (A), pg. 13) is equivalent to the range of CMD within each class in the Climatic Capability Classification for Agriculture. Using the midpoint of this range (assuming more specific data is not available) CMD equals 228 mm.

iv) The AWSC of the upper 50 cm of soil, assuming no lab analyses are available and using the estimates of AWSC based on texture (pg. 46), is:

50 cm x 2.1 mm/cm

AWSC = 105 mm

v) The unimproved rating for the Land Capability for Agriculture subclass A limitation is determined on the basis of SMD.

SMD = CMD-AWSC

= 228 mm - 105 mm

= 123 mm

This falls within Class 3A, the unimproved rating for this soil.

vi) The improved rating for the Land Capability for Agriculture subclass A limitation is determined on the basis of AWSC after stone picking. In this case stone picking is not a consideration. The best improved rating for subclass A of a soil with AWSC of 105 mm is Class 1 (refer to Soil moisture deficiency (A), pg. 13). Therefore the improved rating for this soil is (1).

Example 2

The soil is rapidly drained with 25 cm of fine sandy loam overlying 25 cm of loamy sand. Total coarse fragment (2 mm and larger) content in the upper 25 cm is 30% (with cobbles and stones comprising 10%) while 40% coarse fragments occur in the next 25 cm of soil. The Climatic Capability for Agriculture rating is 6A. No other limitations are apparent.

i) The soil is not poorly or very poorly drained, thus considering the climatic aridity (6A), a soil moisture deficiency may occur.

ii) The unimproved stoniness rating based on the upper 25 cm of soil (refer to Stoniness(P), pg. 24) is 4P. The improved stoniness rating is (3P).

iii) The CMD range for 6A in the Climatic Capability for Agriculture Classification is 341 to 415 mm. Using the midpoint of this range (assuming more specific data is not available) CMD equals 378 mm.

iv) The AWSC of the upper 50 cm of soil profile under unimproved conditions assuming no lab analyses are available and using the estimates of AWSC based on texture is:

$$0.7 \times (25 \text{ cm} \times 1.4 \text{ mm/cm}) + 0.6 \times (25 \text{ cm} \times 1.0 \text{ mm/cm})$$

$$\text{AWSC} = 39.5 \text{ mm}$$

Note that 0.7 and 0.6 represent that portion of the soil volume in each layer after coarse fragments are excluded.

v) The AWSC of the upper 50 cm of soil profile under improved conditions (stone picking considered) assuming no lab analyses are available and using the above estimates of AWSC based on texture is:

$$0.77 (25 \text{ cm} \times 1.4 \text{ mm/cm}) + 0.60 \times (25 \text{ cm} \times 1.0 \text{ mm/cm})$$

$$\text{AWSC} = 42 \text{ mm}$$

The 0.77 represents that portion of the soil volume excluding coarse fragments after stone picking has occurred. (Note improvements by stone picking are determined only for the upper 25 cm of the soil. Only cobbles and stones are assumed pickable.) On the basis of cobble and stone content in the upper 25 cm, a Class 4 level stoniness limitation is determined. A one class improvement in capability due to stone picking is assumed and the midpoint of this

improved class is used in determining the new cobble and stone content, i.e. 3%. Thus total coarse fragment content of the upper 25 cm after improvement is 23%.

vi) The unimproved rating for the Land Capability for Agriculture subclass A limitation is determined on the basis of SMD.

SMD = CMD - AWSC
= 378 mm - 39.5 mm
= 338.5 mm

This falls within Class 5A, therefore the unimproved rating for this soil is 5^{A}_{p}.

vi) The improved rating for the Land Capability for Agriculture subclass A limitation is determined on the basis of AWSC after stone picking. The best improved rating for subclass A of a soil with AWSC of 42 mm is Class 3A (refer to Soil moisture deficiency (A), pg. 13). Therefore the improved rating for this soil is (3^{A}_{p}).

APPENDIX 2

LEGEND FOR LAND CAPABILITY CLASSIFICATION FOR AGRICULTURE

1. EXPLANATORY NOTES

In this classification, mineral and organic soils are each grouped into seven classes on the basis of soil and climate characteristics according to their potentials and limitations for agricultural use. Lands in Classes 1 to 4 inclusive are considered capable of sustained production of common cultivated field crops. The need for management practices to overcome limitations increases, and/or the possible range of crops decreases, from Class 1 to Class 4. Class 5 lands are capable of use only for producing perennial forage crops or specially adapted crops. Class 6 lands are capable of only providing sustained natural grazing for domestic livestock. Class 7 lands are incapable of use for either arable culture or grazing.

This classification takes into account the relative degree and type of limitation or hazard to agricultural use and/or the range of possible crops. It also indicates the type and intensity of management practices required for good management of the soil resource to maintain sustained production. Productivity (i.e. yield per hectare) of any specific crop is not considered.

Important factors on which the classification is based are:

1) The soils will be managed and cropped under a largely mechanized system.

2) This classification provides most lands with two ratings - one under unimproved conditions, and one for improved conditions. Unimproved ratings are based on the conditions that exist at the time of the survey, without irrigation. Improved ratings indicate the capability after existing limitations and/or hazards have been adequately alleviated.

3) In determining improved ratings, irrigation water is assumed to be available and inundation is assumed to be controlled by diking. Other types of improvement considered are drainage, stone removal, salinity alleviation, subsoiling and the intensive addition of fertilizers or other soil amendments. The extent to which these improvements can increase the land capability is determined from site specific assessments.

4) The following are not considered in the classification: distance to market, available transportation facilities, location, farm size, type of ownership, cultural patterns, skill or resources of individual operators, and hazard of crop damage by storms (e.g. wind, hail).

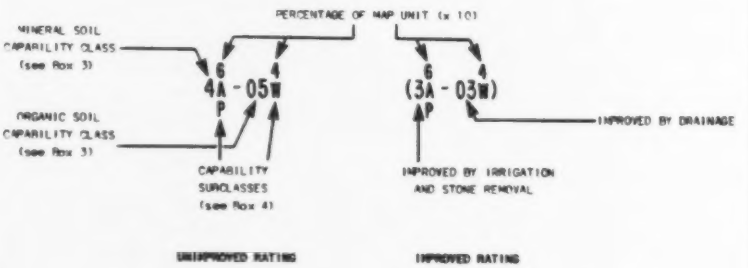
5) The classification does not include capability of lands for trees, tree fruits, grapes, ornamental plants, recreation, or wildlife. A modified classification is applied in some areas climatically suited to tree fruits and grapes (see Box 3).

The agriculture capability classification consists of two main components: (1) the capability class, and (2) the capability subclass. The capability class and subclass together provide information about the degree and kind of limitation for agricultural use. In addition to land capability designation, they are also useful for land use planning and assessment of management needs.

The detailed method for determining the capability classification outlined here is contained in Reference #3 (Box 5).

2. EXAMPLE OF MAP SYMBOL

A dual rating system (for both unimproved and improved conditions) is applied to most lands. Most Class 6 and 7 lands are not considered improvable and are given only unimproved ratings. However, some Class 6 and 7 lands limited by excess water (W), soil moisture deficiency (A), or inundation (I) may be improved by drainage, irrigation and/or diking and in these cases a dual rating is applied. The improved rating is contained in parentheses on the map.



Explanation:

Under unimproved conditions this map unit consists of 60% Class 4 mineral soil with soil moisture deficiency (A) and stoniness (P) limitations, and 40% Class 5 organic soil with frequent or continuous occurrence of excess water (W) during the growing season. The improved rating indicates that with irrigation and stone picking the mineral soil improves to Class 3, and with drainage the organic soil improves to Class 03.

3. CAPABILITY CLASSES

The capability class, the broadest category in the classification, is a grouping of lands that have the same relative degree of limitation or hazard for agricultural use. The intensity of the limitation or hazard becomes progressively greater from Class 1 to Class 7. The class indicates the general suitability of the land for agricultural use.

Two sets of classes exist, one for mineral soils and one for organic soils. The classes are as follows:

LAND CAPABILITY CLASSES FOR MINERAL SOILS

The seven land capability classes for mineral soils are defined and described as follows:

CLASS 1 LAND IN THIS CLASS EITHER HAS NO OR ONLY VERY SLIGHT LIMITATIONS THAT RESTRICT ITS USE FOR THE PRODUCTION OF COMMON AGRICULTURAL CROPS.

Land in Class 1 is level or nearly level. The soils are deep, well to imperfectly drained under natural conditions, or have good artificial water table control, and hold moisture well. They can be managed and cropped without difficulty. Productivity is easily maintained for a wide range of field crops.

CLASS 2 LAND IN THIS CLASS HAS MINOR LIMITATIONS THAT REQUIRE GOOD ONGOING MANAGEMENT PRACTICES OR SLIGHTLY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 2 has limitations which constitute a continuous minor management problem or may cause lower crop yields or slightly smaller range of crops compared to Class 1 land but which do not pose a threat of crop loss under good management. The soils in Class 2 are deep, hold moisture well and can be managed and cropped with little difficulty.

CLASS 3 LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE MODERATELY INTENSIVE MANAGEMENT PRACTICES OR MODERATELY RESTRICT THE RANGE OF CROPS, OR BOTH.

The limitations are more severe than for Class 2 land and management practices are more difficult to apply and maintain. The limitations may restrict the choice of suitable crops or affect one or more of the following practices: timing and ease of tillage; planting and harvesting, and methods of soil conservation.

CLASS 4 LAND IN THIS CLASS HAS LIMITATIONS THAT REQUIRE SPECIAL MANAGEMENT PRACTICES OR SEVERELY RESTRICT THE RANGE OF CROPS, OR BOTH.

Land in Class 4 has limitations which make it suitable for only a few crops, or the yield for a wide range of crops is low, or the risk of crop failure is high, or soil conditions are such that special development and management practices are required. The limitations may seriously affect one or more of the following practices: timing and ease of tillage; planting and harvesting, and methods of soil conservation.

CLASS 5 LAND IN THIS CLASS HAS LIMITATIONS THAT RESTRICT ITS CAPABILITY TO PRODUCING PERENNIAL FORAGE CROPS OR OTHER SPECIALLY ADAPTED CROPS.

Land in Class 5 is generally limited to the production of perennial forage crops or other specially adapted crops. Productivity of these suited crops may be high. Class 5 lands can be cultivated and some may be used for cultivated field crops provided unusually intensive management is employed and/or the crop is particularly adapted to the conditions peculiar to these lands. Cultivated field crops may be grown on some Class 5 land where adverse climate is the main limitation, but crop failure can be expected under average conditions. Note that in areas which are climatically suitable for growing tree fruits and grapes the limitations of stoniness and/or topography on some Class 5 lands are not significant limitations to these crops.

CLASS 6 LAND IN THIS CLASS IS NONARABLE BUT IS CAPABLE OF PRODUCING NATIVE AND/OR UNCULTIVATED PERENNIAL FORAGE CROPS.

Land in Class 6 provides sustained natural grazing for domestic livestock and is not arable in its present condition. Land is placed in this class because of severe climate, or the terrain is unsuitable for cultivation or use of farm machinery, or the soils do not respond to intensive improvement practices. Some unimproved Class 6 lands can be improved by draining, diking and/or irrigation.

CLASS 7 LAND IN THIS CLASS HAS NO CAPABILITY FOR ARABLE CULTURE OR SUSTAINED NATURAL GRAZING.

All classified areas not included in Classes 1 to 6 inclusive are placed in this class. Class 7 land may have limitations equivalent to Class 6 land but they do not provide natural sustained grazing by domestic livestock due to climate and resulting unsuited natural vegetation. Also included are rockland, other nonsoil areas, and small water-bodies not shown on the maps. Some unimproved Class 7 land can be improved by draining, diking and/or irrigation.

LAND CAPABILITY CLASSES FOR ORGANIC SOILS

Organic soils are grouped into seven classes, designated as 01 to 07. The organic soil class definitions are equivalent in terms of their relative capabilities and limitations for agricultural use to those defined for mineral soils.

MODIFIED LAND CAPABILITY CLASSIFICATION FOR TREE FRUITS AND GRAPES

In some areas climatically suitable for growing tree fruits and grapes, a modified classification has been used. The modified classification takes into account the fact that tree fruits and grapes can be grown successfully on steeper and stonier land than the common field crops. An * prescript is appended to the class designation (*1 to *3) to indicate the modified classification has been used. Note only improved ratings are indicated where the modified classification is used.

4. CAPABILITY SUBCLASSES

The subclass indicates lands with similar kinds but varying intensities of limitations and hazards. It provides information on the kind of management problem or use limitation. Except for Class 1 and 01 lands, which have no significant limitations, the capability classes are divided by subclasses on the basis of type of limitation to agricultural use. Each class can include many different kinds of soil, similar with respect to degree of limitation; but soils in any class may require unlike management and treatment as indicated by the subclasses shown. For detailed definitions and guidelines refer to Reference #3 (Box 5).

LAND CAPABILITY SUBCLASSES FOR MINERAL SOILS

A SOIL MOISTURE DEFICIENCY: Crops are adversely affected by droughtiness caused by soil and/or climate characteristics. Improvable by irrigation.

*C ADVERSE CLIMATE: Thermal limitations to plant growth. Minimum temperatures near freezing and/or insufficient heat units during the growing season and/or extreme minimum temperatures during the winter season. Not improvable.

D UNDESIRABLE SOIL STRUCTURE AND/OR LOW PERVIOUSNESS: Soils are difficult to till, require special management for seedbed preparation, pose trafficability problems, have insufficient aeration, absorb and distribute water slowly, and/or have the depth of rooting zone restricted by conditions other than high water table, bedrock or permafrost. Improvement practices vary; improvement if indicated is based on past experience with improving comparable soils.

E EROSION: Past damage from erosion limits agricultural use due to loss of productivity and hampering of access by gullies. Not improvable.

*F FERTILITY: Lack of available nutrients, low cation exchange capacity or nutrient holding ability, high acidity or alkalinity, high levels of carbonates, presence of toxic elements or compounds, or high fixation of plant nutrients. Usually improvable through fertilizers and amendments.

*I INUNDATION: Overflow by streams, lakes or marine tides causes crop damage or restricts agricultural use. Improvable by diking.

*N SALINITY: Soluble salts in the soil reduce crop growth or restrict the range of crops. Improvement practices vary; improvement if indicated is based on past experience with improving comparable soils.

P STONINESS: Coarse fragments significantly hinder tillage, planting and harvesting. Improvable by stone picking, usually only one class because of the continuing nature of the limitation. Note that in areas which are climatically suitable for growing tree fruits and grapes, a Class 5 level stoniness limitation may not be a significant limitation to these crops.

R DEPTH TO SOLID BEDROCK AND/OR ROCKINESS: Bedrock near the surface and/or rock outcrops restrict rooting depth and cultivation. Not improvable.

T TOPOGRAPHY: Steepness or the pattern of slopes hinders the use of farm machinery, decreases the uniformity of growth and maturity of crops, and/or increases the potential for water erosion. Not improvable. Note that in areas which are climatically suitable for growing tree fruits and grapes, a Class 5 level topography limitation may not be considered a significant limitation to these crops.

*W EXCESS WATER: Excess free water, other than from flooding, limits agricultural use and may be due to poor drainage, high water tables, seepage, and/or runoff from surrounding areas. Improvable by drainage; feasibility and level of improvement is assessed on a site specific basis.

*Z PERMAFROST: Permafrost maintains undesirably cold soil temperatures and causes drainage and subsidence problems when it is near the surface. Not improvable.

LAND CAPABILITY SUBCLASSES FOR ORGANIC SOILS

B WOOD IN THE PROFILE: Layers of wood interfere with cultivation and/or with ditching and drain installation. Improvement if indicated is based on past experience with improving comparable soils.

H DEPTH OF ORGANIC SOIL OVER BEDROCK AND/OR ROCKINESS: Bedrock near the surface restricts rooting depth and the feasibility of subsurface drainage, and/or rock outcrops restrict agricultural use. Not improvable.

L DEGREE OF DECOMPOSITION - PERMEABILITY: Degree of decomposition affects drainage, permeability, capillary rise of water and rate of subsidence. Layers of mineral soil in an organic profile may pose a limitation to optimum crop yield and to drainage. Not improvable.

* These subclasses are the same for both organic soils and mineral soils.

5. SOURCES OF FURTHER INFORMATION

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LAND CAPABILITY FOR AGRICULTURE MAPS ARE AVAILABLE FROM:

The Map Library, Planning and Resource Management Division, British Columbia Ministry of Environment, Parliament Buildings, Victoria, B.C. V8V 1X4

6. CREDITS

Mapped by:

Date mapped:

Date and scale of photography:

Drafted by:

Date drafted:

Revised:

Base map provided by:

7. LOCATION MAP

POOR

QUALITY

ORIGINAL